

Biology: Structure and Function

Stage 1 Desired Results

ESTABLISHED GOALS:	Transfer	
<u>Competencies:</u> • Structure & Function: Students will demonstrate the ability to use evidence to support claims about the relationship among structure and function of natural and human designed objects. • Stability & Change in Systems: Students will demonstrate the ability to investigate and analyze static and dynamic conditions of natural and human designed systems in order to explain and predict changes over time. • Nature of Science: Student will demonstrate the ability to work collaboratively and individually to generate testable questions or define problems, plan and conduct investigations using a variety of research methods in a various settings, analyze and interpret data, reason with evidence to construct explanations in light of existing theory and previous research, and effectively communicate the research processes and conclusions. • Students will demonstrate the ability to analyze and summarize text and integrate knowledge to make meaning of discipline-specific materials. • Students will demonstrate the ability to produce coherent and supported writing in order to communicate effectively for a range of discipline-specific tasks, purposes, and audiences. • Students will demonstrate the ability to speak purposefully and effectively by strategically making decisions about content, language use, and discourse style. <u>Content Standards:</u> • HS-LS1-1. Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells. • HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. • HS-LS1-3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.	<i>Students will be able to independently use their learning to evaluate the importance of structure and function within a system.</i>	
	Meaning	
	ENDURING UNDERSTANDINGS <i>Students will understand that...</i> • models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. • investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. • feedback (negative or positive) can stabilize or destabilize a system.	ESSENTIAL QUESTIONS • <i>Is there a most vital part of a cell in maintaining homeostasis?</i>

Acquisition		
	<i>Students will know...</i> • that systems of specialized cells within organisms help them perform the essential functions of life. • that all cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins. • that multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. • that feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage	<i>Students will be skilled at...</i> • constructing explanations based on evidence. • developing and using models. • planning and conducting investigations.

	(through positive feedback) or discourage (negative feedback) what is going on inside the living system. <u>vocabulary:</u> organelle, cell, cell membrane, lysosome, mitochondria, nucleus, nucleolus, plastids, vacuole, ribosome, endoplasmic reticulum, golgi apparatus, centriole, nuclear membrane, nuclear pore, cytoskeleton, cell wall, cytoplasm, chromatin, chromosomes, vesicle, pilus, flagella, cilia, capsule, plasmid, nucleoid, contractile vacuole, phospholipid bilayer, fluid mosaic model, transport proteins, hypotonic, hypertonic, isotonic, extremophile, diffusion, osmosis, facilitated diffusion, active transport, homeostasis, negative feedback, positive feedback, prokaryotic, eukaryotic, active transport, passive transport, cell theory, light microscope (parts and functions), virus	
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Content Area Literacy Standards

- RST.9-10.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
- RST.9-10.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
- RST.9-10.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9-10 texts and topics*.
- RST.9-10.5 Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., *force, friction, reaction force, energy*).
- RST.9-10.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
- RST.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.
- WHST.9-10.1 Write arguments focused on *discipline-specific content*.
- WHST.9-10.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
- WHST.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- WHST.9-10.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
- WHST.9-10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
- WHST.9-10.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
- WHST.9-10.9 Draw evidence from informational texts to support analysis, reflection, and research.

21st Century Skills

- *use systems thinking*
- *think creatively*
- *apply technology effectively*
- *reason effectively*

Stage 2 - Evidence

<i>Evaluative Criteria</i>	<i>Assessment Evidence</i>
	PERFORMANCE TASK(S):
	OTHER EVIDENCE:

Stage 3 – Learning Plan

Summary of Key Learning Events and Instruction

<i>Science and Engineering Practices</i>	<i>Mathematics Integration</i>
S&EP 2. Developing and using models S&EP 3. Planning and carrying out investigations S&EP 6. Constructing explanations (for science) and designing solutions (for engineering) S&EP 8. Obtaining, evaluating, and communicating information	
<i>Technology Integration</i>	<i>District Materials</i>